ITS Operational Tests Awarded from Fiscal Year 1991 to Fiscal Year 1994

No.	Projects	Location	Funding		Percent Non-Fed Funding
			Federal ITS	Total Cost	
61*	**Spread Spectrum Radio Traffic Interconnect** This test will evaluate the use of spread spectrum radio to interconnect traffic signal communications devices within the Los Angeles ATSAC signal system. The radios will be tested in a network of signals to determine their ability to reliably reroute communications links, work in a variety of geographies, and provide for large-scale communications.	Los Angeles, California	$2,594,075	$3,824,685	32%
62*	**Suburban Mobility Authority for Regional Transportation (SMART)** This project will provide a system with automatic reservations, scheduling and dispatch for paratransit operations and an automatic vehicle location system for fleet management. The project will be integrated with FAST-TRAC and the Michigan DOT's Metropolitan Transportation Center to provide an intermodal transportation information service.	Detroit, Michigan	$12,000,000	$15,000,000	20%
63	**TransCal** This project will evaluate the integration of road, traffic, transit, weather and value-added traveler services information sources from across the entire geographic region. Land line and cellular telephones, and wireless FM subcarrier networks, will be used to transport information to and from travelers via telephones, personal digital assistants, in-vehicle navigation/display devices, interactive kiosks, etc. The project will also include a satellite-based Mayday system that will provide low-cost coverage within the corridor.	California and Nevada	$3,163,000	$7,155,000	56%
64*	**TRANSMIT (TRANSCOM)** This test will evaluate the use of automatic vehicle identification (AVI) technology as an incident detection tool. The system consists of additional AVI "tag" readers which allow vehicles equipped with transponders to serve as traffic probes to identify potential incidents by comparing actual to predicted travel times between readers.	Rockland County/Bergen County, New Jersey	$2,750,000	$3,437,300	20%
65	**Travel-Aid** This project will use variable speed limit signs, changeable message signs, and in-vehicle communications and signing equipment to improve safety along a 40-mile stretch of I-90 across Snoqualmie Pass, a rural area prone to snow, ice and poor visibility.	Snoqualmie Pass, Washington State	$1,878,525	$4,690,791	60%

* Indicates operational tests which have been funded, either partially or totally, with Congressionally earmarked funds.

ITS Operational Tests Awarded from Fiscal Year 1991 to Fiscal Year 1994

No.	Projects	Location	Funding		Percent Non-Fed Funding
			Federal ITS	Total Cost	
66	**TravInfo** The test designs and implements a comprehensive, region-wide traveler information system capable of supplying a broad array of information devices and users with transportation information both before and during trips. Multi-modal transportation information centers will integrate transportation information from a wide variety of sources and make the information available to the general public, public agencies and commercial (value-added) vendors.	San Francisco Bay Area, California	$4,800,000	$7,075,000	32%
67*	**TravLink** This project implements an ATIS/APTS along the I-394 corridor extending west from the downtown Minneapolis area. The project provides real-time transit schedule and traffic information through a combination of kiosks and terminals at work, home, shopping centers, and transit stations.	Minneapolis/St. Paul, Minnesota	$4,071,000	$6,525,000	38%
68*	**TravTek** This test provided traffic congestion information, motorist services ("yellow pages") information, tourist information and route guidance to operators of 100 test vehicles, rented through AVIS, that were equipped with in-vehicle TravTek devices. Route guidance instructions were displayed on a moving map and reflected real-time traffic conditions in the TravTek traffic network.	Orlando, Florida	$2,679,163	$12,000,000	78%
69*	**Trilogy** This test will provide traveler information through three different communications techniques: the Radio Broadcast Data System-Traffic Message Channel (RBDS-TMC), a low-speed FM subcarrier, and a high-speed subcarrier similar to the STIC system. The receiving devices will provide end users with area and route-specific en-route advisories on the highway operating conditions in the Twin Cities Metropolitan Area.	Twin Cities Metropolitan Area	$2,800,000	$4,000,000	30%
70	**Twin Cities Smart Traveler** This project conducted a preliminary study of the potential of smart cards to improve paratransit service.	St. Paul, Minnesota	$40,000	$40,000	0%
71	**Washington, D.C., Advanced Fare Media** This project tests a fare collection system that allows passengers to use a smart card to pay for metrorail, metrobus and parking. The contractor has developed, installed and is demonstrating a contactless, smart-card-based fare collection system.	Washington, D.C., Metropolitan Area	$1,000,000	$1,000,000	0%

* Indicates operational tests which have been funded, either partially or totally, with Congressionally earmarked funds.

ITS Operational Tests Awarded from Fiscal Year 1991 to Fiscal Year 1994					
No.	**Projects**	**Location**	**Funding**		**Percent Non-Fed Funding**
			Federal ITS	**Total Cost**	
72	**Wilmington, Delaware, Smart DART** This project will test smart card technology in a transit application in Wilmington, Delaware. A smart card fare collection system will be developed for the Wilmington bus fleet.	Wilmington, Delaware	$1,191,424	$2,179,155	45%
73	**Winston-Salem Mobility Management** This project evaluates a mobility management system involving an automated scheduling and demand-responsive, shared-ride transit for the young, elderly, and disabled who are unable to use fixed-route transit. The project extends the transportation service to fixed-route transit, ridesharing and taxis used by the general public.	Winston-Salem, North Carolina	$220,000	$275,000	20%

* Indicates operational tests which have been funded, either partially or totally, with Congressionally earmarked funds.

APPENDIX II

Research And Development Projects With Cost-Share Arrangements			
Project Name	**Description**	**Total Project Cost**	**Federal Share**
	ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS) ADVANCED TRAFFIC MANAGEMENT SYSTEMS (ATMS)		
Real-Time Traffic Adaptive Control for ITS	This study develops a prototype real-time, traffic adaptive signal control system suitable for use in an ITS environment by 1997, and is the first of three studies which will eventually develop five prototypes for laboratory evaluation, from which one will be selected for further development and field evaluation by 1997. CONTRACTORS: Farradyne Systems, Inc., (prime) in a consortium composed of state and local Departments of Transportation.	$4,915,852	$3,403,382 (60%)
Rural Applications of Advanced Traveler Information Systems (ATIS)	The research will examine a broad range of rural environments, categories of travelers, ATIS applications, and advanced electronics and communications technologies to determine the needs for ATIS services in small and rural urban areas. CONTRACTORS: JHK & Associates (lead), Hughes, Virginia Tech, and Bell-Atlantic.	$1,836,000	$1,673,500 (92%)
Encoding Scheme for Advanced Traveler Information System (ATIS)/Advanced Traffic Management System (ATMS) Data Fusion	The State of Washington is currently developing a data fusion algorithm for ATMS/ATIS applications. Funding would partially cover the development of the methodology and investigate possible approaches to enable national implementation. CONTRACTOR: Washington State Department of Transportation.	$247,000	$198,000 (80%)
Integration of Traffic Operations and Traffic Data Collections	This research will establish a process and methodology for the integrated collection of traffic data. CONTRACTORS: Georgia and Washington State Departments of Transportation.	$495,000	$345,000 (60%)
Fixed Route Bus Data for GIS	This project will complete the development of the national bus fixed route database of the transit GIS. This project will also facilitate the addition of the national Transit GIS database to the proposed National Transportation System.	$400,000	$300,000 (75%)
Design of Support Systems for ATMS Control Centers	This study will develop 9 support systems (software) for mature ATMS control centers, and define the platforms and plan for integration with other ATMS elements.	$3,072,679	$2,942,679 (96%)

Research And Development Projects With Cost-Share Arrangements

Project Name	Description	Total Project Cost	Federal Share
ADVANCED VEHICLE CONTROL AND SAFETY SYSTEMS (AVCSS)			
Human Factors Studies for the Evaluation, Analysis, and Operational Assessment of an Intelligent Cruise Control System	This program will address a range of human factors issues associated with implementation of Intelligent Cruise Control (ICC) systems. CONTRACTOR: Ford Motor Company.	$1,744,057	$900,000 (52%)
Braking Analysis for Heavy Commercial Vehicle Collision Avoidance	This project will study the feasibility of adding automatic braking to heavy commercial vehicles. CONTRACTOR: Eaton Corporation.	$559,290	$451,138 (80%)
Characteristics of a Forward-Looking Automotive Radar Sensor	This project will develop a knowledge base of radar cross-section data from measurements in the laboratory and a variety of freeway settings using a prototype forward-looking automotive radar sensor. CONTRACTOR: Environmental Research Institute of Michigan and TRW, Inc.	$1,139,487	$880,376 (78%)
Vehicle-Based Lane Detection	Evaluates sensor performance under various operating conditions; identifies general lane detection sensor performance requirements. CONTRACTOR: Rockwell International.	$824,733	$414,733 (50%)
Driver Status/Performance Monitoring	This project will lead to the development of vehicle-based countermeasures that will monitor driver status/performance, detect degraded performance, and provide a warning signal or other countermeasure to prevent its continuance. CONTRACTOR: MTI Research, Inc.	$835,000	$660,000 (79%)
Heavy Vehicle Dynamic Stability Enhancement	This project will develop, evaluate, and deploy two prototype systems. The first is a Rollover Stability Advisor (RSA) to warn drivers of how close to rollover threshold they're operating their vehicles. The second is a Rearward Amplification Suppression System (RAMS) which employs electronic braking as an active controller to prevent rollovers when multiple-trailer combinations execute abrupt obstacle avoidance maneuvers at speeds above 70 kph (45 mph). CONTRACTORS: University of Michigan Transportation Research Institute, Freightliner, Hendrickson-Turner, Midland-Grau, Rockwell International, and TRW/Steering Division.	$1,319,016	$646,896 (49%)
Development, Evaluation, and Deployment of an Intelligent Commercial Vehicle Communication and Powering Enhancement System	This project will develop, evaluate, and deploy prototypes for field evaluation of enhanced systems that provide electrical powering and signaling/communications capability between and among trailer(s) and tractor in a combination-unit heavy truck. Two separate teams are working under this cooperative agreement. CONTRACTORS: (1) Delco Electronics, Vehicle Enhancement Systems, Ryder Truck Rental Inc., Freightliner, Volvo-GM; (2) Eaton Corp., PACCAR, Great Dane Trailers, Thermo-King, Caterpillar Grote, and the American Trucking Associations.	Eaton - $828,506 Delco - $2,503,167	Eaton - $476,169 (57%) Delco - $575,000 (23%)

Research And Development Projects With Cost-Share Arrangements			
Project Name	**Description**	**Total Project Cost**	**Federal Share**
ADVANCED VEHICLE CONTROL AND SAFETY SYSTEMS (AVCSS)			
Fostering the Development, Evaluation, and Deployment of Forward Crash Avoidance Systems (FOCAS)	This program will facilitate the development of a range of commercial sensors and associated application systems that supplement the forward crash avoidance performance of drivers. CONTRACTOR: The University of Michigan Transportation Research Institute (UMTRI).	$1,746,824	$899,777 (52%)
Automotive Collision Avoidance System Development	This program aims to advance the state-of-the-art and reduce the cost of existing and emerging collision avoidance technologies. Its goal is near-term commercial safety systems introduction. CONTRACTORS: Delco Electronics, GM Research, and Hughes Research Labs.	$13,034,000	$6,116,000 (46%)
Portable Data Acquisition System for Crash Avoidance Research	The objectives of this project are to apply state-of-the-art technology and methods to develop an easily-installed, portable instrumentation package and a set of analytical methods/tools to allow driver-vehicle performance data to be collected using a variety of vehicle types. CONTRACTORS: The Department of Energy (interagency agreement with Oak Ridge National Laboratory), and Scientific Atlanta Cooperative Research and Development Agreement (CRADA).	$1,324,900	$1,11,800 (85%)
AUTOMATED HIGHWAY SYSTEM (AHS)			
PATH AVCS Research Program	Ongoing research is focused on sensors and communications for longitudinal control of vehicles, and on advanced braking actuators for AHS. CONTRACTOR: The University of California Partners for Advanced Transit and Highways (PATH) Program.	$2,500,000	$1,275,000 (51%)
National Automated Highway System Consortium	The AHS program is a broad national effort to provide the basis for, and transition to, the next major performance upgrade of the U.S. vehicle/ highway system by using automated vehicle control technology. A prototype system will be demonstrated in 1997. CONTRACTORS: General Motors (lead), Bechtel Corporation, the California Department of Transportation (Caltrans), Carnegie-Mellon University of Robotics Institute, Delco Electronics, Lockheed-Martin, Parsons Brinckerhoff, and the University of California Partners for Advanced Transit and Highways (PATH) Program.	$202,000,000	$160,000,000 (80%)
OTHER ITS RESEARCH-RELATED PROJECTS			
ITS Research Centers of Excellence	The three Centers of Excellence will create a research environment where a quality mix of basic and applied research will be conducted to advance the ITS Program while attracting high quality students and professors to the ITS program. CONTRACTORS: University of Michigan, Texas A&M University, and Virginia Polytechnic Institute.	$18,350,000	$15,350,000 (80%)

APPENDIX III

Examples of "Early Deployments"

1. Route Guidance in the U.S.
2. Electronic Toll Collection in the U.S.
3. Collision Warning Systems in the U.S.
4. Intelligent Cruise Control in the U.S.
5. Transit Automated Vehicle Locator Systems in the U.S. and Canada
6. Deployment of Advanced Traffic Management Systems in the U.S. by State Agencies
7. Measured Benefits of Deployed ITS Technologies
8. The National Automated Highway System Consortium
9. Traffic Information on the World Wide Web
10. Multimodal Transit Information on the World Wide Web
11. Traveler Services Information on the World Wide Web
12. Commuter and Intercity Passenger Rail Information on the World Wide Web

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International ITS Information Clearinghouse Fact Sheet #1

Route Guidance in the U.S.

Company: Oldsmobile Division of the General Motors Corporation
Product Name: Guidestar, GPS-based
Cost: $1,995 MSRP
Description: This in-vehicle navigation system is currently available as an option on Oldsmobile Eighty-Eight models in California, Michigan, Indiana, Florida, Georgia, and Illinois. The system will be available in Washington DC, Maryland, Virginia, New York, New Jersey and Rhode Island in early 1995. The system will be available nationally in the first quarter of 1996 (1).

Company: Sony
Product Name: NVX-F160, GPS-based
Cost: $2,995 MSRP
Description: This in-vehicle navigation system is currently available at major car stereo dealers throughout California and Nevada (2).

Company: Avis Rental
Product Name: Guidestar, GPS-based
Cost: Not Available
Description: Avis is making vehicle navigation available through its rental fleet. The system was developed by Zexel and manufactured by Rockwell. The system is currently available in the San Francisco Bay area, San Jose and South Florida. Final testing is now being conducted in the following areas: parts of Metropolitan NY, Greater Detroit, areas of Illinois including Chicago and areas of Indiana including Indianapolis (3).

Company: Delco Electronics
Product Name: Telepath 100, GPS-based
Cost: $800 (estimated)
Description: This in-vehicle navigation system provides distance and direction to selected destinations. Telepath 100's lower cost is attributable to its being fully integrated into a car stereo. The system will be introduced in 1995 and is currently being field tested by Avis rental cars in Indianapolis (4).

Company: Hertz
Product Name: NeverLost, GPS-based
Cost: Not Available
Description: Hertz is making vehicle navigation available through its rental fleet. The system will be available in December 1994 in California and Florida and in Atlanta, Boston, Chicago, Detroit, New York, and Washington DC. (13).

Company: Pioneer
Product Name: GPS-X77, GPS-based
Cost: $2,700
Description: Pioneer will begin to sell it's in-vehicle navigation system in the U.S. in January 1995. Pioneer expects to sell 3,000 units in 1995 (5).

Company: Amerigon Inc.
Product Name: AudioNav, non GPS-based
Cost: under $500 (estimated)
Description: This in-vehicle navigation system features interactive voice system technology. AudioNav was marketed by Alpine, Clarion, Fujitsu Ten's Eclipse and Kenwood at the Consumer Electronics Show in Las Vegas, January 1995 (6).

Company: Rockwell
Product Name: PathMaster, GPS-based
Cost: Not Available
Description: In the near future Rockwell plans to sell a vehicle navigation system called PathMaster which will be one of the most advanced route guidance systems on the market. The system will be available through the automotive aftermarket (7).

Company: Mercedes Benz
Product Name: APS (Auto-Pilot System), GPS-based
Cost: Not Available
Description: This in-vehicle navigation system will be available on some 1996 models. APS uses computer technology developed with Bosch and Blaupunkt. The system guides the driver to destinations with a dash-mounted display and synthesized voice commands (8).

Company: Siemens
Product Name: Ali-Scout, non GPS-based
Cost: Not Available
Description: Ali-Scout is a beacon-based dynamic route guidance system being tested as part of FAST-TRAC, an operational field test in Oakland County, MI (9).

Company: Motorola
Product Name: Not Available, GPS-based
Cost: Not Available
Description: Motorola is providing the dynamic route guidance system as part of the ADVANCE operational field test in the Chicago area (10).

Company: Clarion
Product Name: NAX-500, GPS-based
Cost: $1,500
Description: Clarion's in-vehicle navigation system uses dead-reckoning and speed sensors that tie into the car's engine management system. Clarion hopes to market the system by the end of 1995 (11).

Company: Itochu International
Product Name: Not Available, GPS-based
Cost: Not Available
Description: This in-vehicle navigation system was showcased at the Winter Consumer Electronics Show. The system uses Etak software and will be available at the end of 1995 (12).

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(* catalog numbers from the National ITS Program Database)

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International ITS Information Clearinghouse Fact Sheet #2

Electronic Toll Collection in the U.S.

There are 12 toll agencies in 9 states currently operating electronic toll collection (ETC) systems. These systems handle approximately 250,000 toll transactions per day. Systems are being planned or considered in another 12 states. Potentially there are an additional 23 toll agencies which could be operating ETC systems in the near future. The following is a list of states currently involved with ETC (operating systems are italicized).

State: California

1. California Private Transportation Company: State Route 91 Electronic Toll Road, MFS (1)
2. CALTRANS: Advanced Toll Collection and Accounting System, MFS (1)
3. Transportation Corridor Agencies (TCA) Foothill: MFS and Lockheed (1)
4. San Joaquin Hills and Eastern Transportation Corridor projects in Orange County: MFS and Lockheed (1)
5. Golden Gate Bridge, Highway & Transportation District: ETC system being planned (9)

State: Colorado

1. *E-470 Public Highway Authority Denver: EXPRESSTOLL, X-Cyte, implemented 7/91 (9)*

State: Delaware

1. Delaware River & Bay Authority: Delaware Memorial Bridge, ETC system under consideration (9)

State: Florida

1. Florida Department of Transportation: Florida Turnpike, ETC system being planned (9)
2. *Orlando-Orange County Expressway Authority: E-Pass, Mark IV, operational system (10)*

State: Georgia

1. *Georgia Department of Transportation: Georgia Route 400 extension near Atlanta, Amtech subcontract to Lockheed, operational since August 1993 (3)*

State: Illinois

1. *Illinois State Toll Highway Authority: I-Pass Electronic Toll Collection and Traffic Management system, AT/Comm, 200 lanes to become operational by November 1994 (7)*

State: Indiana

1. Indiana Department of Transportation - Toll Road Division: Indiana Toll Road, ETC system being planned (9)

State: Kansas

1. Kansas Turnpike Authority: K-TAG, Amtech, 2-lane test scheduled for the 2nd quarter of 1994 (8)

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State: Louisiana

1. *Louisiana Department of Transportation and Development: Crescent City Connection Bridge, Amtech, implemented 1/4/89 (3,9)*
2. *Greater New Orleans Expressway Commission: Lake Pontchartrain Causeway, implemented 12/17/90, Amtech (3, 9)*

State: Maine

1. Maine Turnpike: Electronic Toll and Traffic Management, AT/Comm, contract awarded 10/25/94 (4)

State: Maryland

1. Maryland Transportation Authority: Baltimore Harbor Tunnel, JFK Memorial Highway, Ft. McHenry Tunnel, Frances Scott Key Bridge, Harry W. Nice Memorial Bridge, William J. Lane Jr. Memorial Bridge, Thomas J. Hatem Memorial Bridge, ETC systems being planned (9)

State: Massachusetts

1. Massachusetts Port Authority: recently tested Amtech technology (11)

State: Michigan

1. Mackinac Bridge Authority: Mackinac Bridge, ETC system being planned (9)

State: New Jersey

1. New Jersey Expressway Authority: Atlantic City Expressway, E-ZPass system being planned (9)
2. New Jersey Highway Authority: Garden State Parkway, E-ZPass system being planned, Mark IV (9)
3. *Port Authority of New York and New Jersey: Lincoln Tunnel, Electronic Toll System for Buses, SAIC and Amtech, operational since April 1988 (3)*
4. Port Authority of New York and New Jersey: Bayonne Bridge, George Washington Bridge, Goethels Bridge, Holland Tunnel, Lincoln Tunnel, Outerbridge Crossing, E-ZPass systems being planned (9)

State: New York

1. MTA Bridges and Tunnels: E-ZPass Electronic Toll System, Mark IV, contract signed 5/94 (2), Amtech systems integrator, contract awarded 8/94 (5), E-ZPass systems for all bridges and tunnels are being planned, Mark IV (9)
2. *New York State Thruway Authority: Spring Valley, Tappanzee Bridge and Grand Island Bridge, Amtech, implemented August 1993 for Spring Valley, Tappanzee Bridge and Grand Island Bridge implemented October 1993 (3)*
3. Buffalo & Fort Erie Public Bridge Authority: Peace Bridge, ETC system being planned (9)

State: Ohio

1. Ohio Turnpike Commission: Ohio Turnpike, ETC system being planned (9)

State: Oklahoma

1. *Oklahoma Turnpike Authority: PikePass, Amtech, implementation began in 1/91 (3)*

State: Pennsylvania

1. Pennsylvania Turnpike Commission: E-ZPass Electronic Toll System, Mark IV, contract announced 6/27/94 (2)

State: Rhode Island

1. Rhode Island Turnpike & Bridge Authority: Mt. Hope Bridge and Newport Bridge, ETC systems under consideration (9)

State: Texas

1. *Texas Turnpike Authority: Dallas North Tollway, TollTag, Amtech, system operational since mid-1989 (3)*
2. *Harris County Toll Road Authority: Sam Houston Tollway and the Hardy Toll Road, ETC provided for 69 lanes in October 1992 (3)*
3. *Texas Department of Transportation: Houston Freeway Monitoring using ETTM AVI technology, Amtech, contract awarded in May 1993 (3)*

State: Virginia

1. Toll Road Investors Partnership II (Trip II): Dulles Greenway, Syntonic Technology, contract awarded 7/12/94 (6).
2. Virginia DOT: Dulles Toll Road, ETC system is being planned (10)

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(* catalog numbers from the National ITS Program Database)

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International ITS Information Clearinghouse Fact Sheet #3

Collision Warning Systems in the U.S.

Collision warning systems such as Delco Electronics' FOREWARN and VORAD's CWS are currently available in the U.S. for truck and bus applications. Automotive supply companies are developing low-cost collision warning technologies for the passenger car market. General Motors, Ford and Chrysler are also currently developing systems for passenger cars. It is expected that these systems will be available by the end of the decade. The following is a list of companies involved in collision warning systems.

Company: Delco Electronics, part of General Motors' Hughes aerospace unit
Product Name: FOREWARN
Cost: $1,895
Description: This 360 degree radar detection system has been installed on school buses since March 1993 and detects the presence of children in the driver's blind-spots. To date 2000 units have been sold. Delco collision warning systems will be available for the commercial truck market in 1995 and will be available for passenger cars in 1998 or 1999 (1).

Company: Eaton - VORAD
Product Name: EVT-200 Collision Warning System (CWS)
Cost: less than $2,500
Description: This radar-based collision warning system became available as a retrofit unit for trucks in June 1994. The system offers front and side detection for equipped vehicles. Greyhound Lines has about 1600 VORAD collision warning systems in operation. In 1993 Greyhound had a 21 percent reduction in total number of accidents compared to 1992 (2).

Company: TRW
Product Name: Not Available
Cost: $200 wholesale
Description: This radar-based blind spot detection system scans the side and rear of a passenger vehicle when a turn signal is activated. This system is not currently available on the market (3).

Company: Siemens
Product Name: SideMinder
Cost: $50 wholesale price in automotive production quantities
Description: This collision warning system uses infrared sensor and light-emitting diode (LED) technology and is activated when the turn signal is engaged. The infrared sensors are located in the vehicle's taillight assembly and the LED signals are located in the passenger- and driver-side mirrors. Prototypes are now being tested in the U.S. and Europe (4).

Company: Amerigon Inc.
Product Name: Not Available
Cost: Not Available
Description: Amerigon is employing a simpler radar-based technology for its collision warning system. Instead of generating continuous radar waves, Amerigon's system generates single impulses which decreases the costs of the system's computer hardware. Amerigon is being approached by manufacturers regarding the system (5).

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International ITS Information Clearinghouse Fact Sheet #4

Intelligent Cruise Control in the U.S.

Intelligent cruise control (ICC) systems are expected to be available as optional equipment on passenger vehicles by the end of the decade. Currently there are two competing technologies, infrared and radar systems which are being developed. Radar-based systems have the ability to function in foggy conditions whereas infrared-based systems do not. Leica Corporation of Switzerland has been testing an early version of ICC on a Saab 9000 and has been working with Daimler-Benz in the European Prometheus program. TRW demonstrated a radar-based ICC system on a Chrysler LHS at last year's IVHS AMERICA annual meeting in Atlanta.

Buick (Division of GM) recently introduced the XP2000 concept car at the North American International Auto Show this past January in Detroit. This concept car showcases a variety of ITS technologies including adaptive cruise control. Ford Motor Company believes that ICC is the type of innovation which is viable in the foreseeable future.

The market for ICC looks promising in the United States. Approximately 70 percent of new cars come equipped with traditional cruise control. ICC systems are expected to cost between $300-$350 which is about $100 more than existing cruise control systems. A recent survey of automotive executives and engineers predicted that there will be a 50 percent application rate of ICC by the year 2000. However, liability issues may be a concern to potential automotive manufacturers marketing ICC in the U.S. The following automotive suppliers are involved with ICC systems: Delco Electronics, Leica Corp., TRW, Rockwell, Raytheon, and Vorad.

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International ITS Information Clearinghouse Fact Sheet #5

Transit Automated Vehicle Locator Systems in the U.S. and Canada

Twenty-five (25) transit properties in fifteen (15) states and three Canadian territories currently operate automated vehicle location systems. These systems monitor and control approximately 13,460 vehicles. In addition, another nineteen (19) procurements (new or enhancements to existing) will be in place in 1995 adding 9,170 vehicles and five states to the count. Of the entities listed, twenty (20) properties have chosen non-GPS-based systems while twenty-three (23) GPS systems are deployed or planned. Systems which are currently operational are italicized.

State: Arizona

1. Tucson-Sun Tran; GPS technology for 200 vehicles to be procured in 1995

State: California

1. *San Francisco-MUNI; signpost technology for 850 vehicles operational in 1985*
2. *San Mateo-samTrans; signpost technology for 320 vehicles operational in 1994*
3. Fresno-FAX; GPS technology for 110 vehicles to be procured in 1995
4. Oakland-AC Transit; GPS technology for 680 vehicles to be procured in 1995
5. San Francisco-MUNI; GPS technology for 850 vehicles to be procured in 1995
6. Stockton; GPS technology for 90 vehicles to be procured in 1995

State: Colorado

1. *Denver-RTD; GPS technology for 1,200 vehicles operational in 1994*

State: Florida

1. *Miami-MDTA; GPS technology for 600 vehicles operational in 1995*
2. *Palm Beach-CoTran; signpost technology for 100 vehicles*
3. *Tampa-Hartline; signpost technology for 167 vehicles operational in 1994*
4. Broward Co. Mass Transit; GPS technology for 200 vehicles to be procured in 1995

State: Illinois

1. *Champaign/Urbana-MTD; Loran C technology for 50 vehicles*
2. Chicago-CTA; GPS technology for 2,080 vehicles to be procured in 1995
3. Suburban Chicago-PACE; GPS technology for 1,000 vehicles to be procured in 1995

State: Kentucky

1. *Louisville-TARC; signpost technology for 300 vehicles operational in 1994*

State: Maryland

1. *Baltimore-MTA; Loran C technology for 50 vehicles operational in 1991*
2. Baltimore-MTA; GPS technology for 850 vehicles to be procured in 1995

State: Michigan

1. Ann Arbor-AATA; GPS technology for 70 vehicles to be procured in 1995
2. Detroit-DDOT; GPS technology for 500 vehicles to be procured in 1995

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George R. Brown Conference Center
Houston, Texas

State: Missouri

1. *Kansas City-KCATA; signpost technology for 224 vehicles operational in 1991*

State: Minnesota

1. *Minneapolis-MTC; GPS technology for 80 vehicles operational in 1994*

State: Nevada

1. Reno-RTC Citifare; GPS technology for 90 vehicles to be procured in 1995

State: New Mexico

1. Albuquerque-Sun Tran; GPS technology for 30 paratransit vehicles to be procured in 1995

State: New Jersey

1. *Newark-NJTA; signpost technology for 2,800 vehicles operational in 1995*

State: New York

1. *Westchester County Transit; signpost technology for 100 vehicles*
2. Buffalo-NFTA; GPS technology for 350 vehicles to be procured in 1995
3. New York City Transit Authority; GPS technology for 230 vehicles to be procured in 1995 (ultimately 4,000 vehicles)
4. Syracuse-RTA Centro; GPS technology for 190 vehicles to be procured in 1995

State: Ohio

1. Cincinnati-SORTA; GPS technology for 380 vehicles to be procured in 1995
2. Lake City; GPS technology for 60 vehicles to be procured in 1995

State: Pennsylvania

1. *Beaver County Transit Authority; Loran C technology for 36 vehicles operational in 1991*

State: Texas

1. *Dallas-DART; GPS technology for 1,280 vehicles operational in 1994*
2. *San Antonio-VIA; signpost technology for 550 vehicles operational in 1987*
3. *Houston-METRO; terrestrial triangulation technology for 140 paratransit vehicles operational in 1993*
4. Houston-METRO; technology for 1,200 vehicles to be procured in 1995

State: Virginia

1. *Norfolk-TRT; signpost technology for 180 vehicles*

State: Washington

1. *Seattle-Metro; signpost technology for 1,100 vehicles*

State: Wisconsin

1. *Milwaukee-MCTS; GPS technology for 440 vehicles operational in 1994*
2. *Sheboygan-ST; signpost technology for 100 vehicles*

Territory: Nova Scotia

1. *Halifax; signpost technology for 160 vehicles operational in 1987*

Territory: Ontario

1. *Hamilton; dead reckoning technology for 280 vehicles*
2. *Ottawa; radio frequency tag technology for 800 vehicles operational in 1994*

Territory: Quebec

1. *Toronto; signpost technology for 1,600 vehicles operational in 1989*

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International ITS Information Clearinghouse Fact Sheet # 6

Deployment of Advanced Traffic Management Systems in the U.S. by State Agencies

There are more than 20 Advanced Traffic Management Systems currently deployed in the U.S. by state transportation agencies. These systems use a variety of detection, control, and information technologies to manage the flow of traffic. There are over 2,000 miles of roadways instrumented with more than 2,100 ramp meters, 600 changeable message signs, and 375 closed-circuit TV (CCTV) cameras, plus a variety of other technologies. Several of the systems coordinate their traffic management with systems operated by local jurisdictions.

Name:	Sacramento Transportation Management Center	1
Location:	Sacramento, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	22	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, 1 CCTV Camera	
Control Technologies:	19 Ramp Meters	
Information Technologies:	8 Changeable Message Signs, Highway Advisory Radio	

Name:	Vallejo Interim Transportation Management Center	2
Location:	San Francisco, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	118	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, 58 CCTV Cameras	
Control Technologies:	96 Ramp Meters	
Information Technologies:	23 Changeable Message Signs, Highway Advisory Radio	

Name:	Central Valley Transportation Management Center	3
Location:	Fresno, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	12	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors	
Control Technologies:	15 Ramp Meters	
Information Technologies:	35 Changeable Message Signs, Highway Advisory Radio	

Name:	Los Angeles Transportation Management Center	4
Location:	Los Angeles, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	700	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, 27 CCTV Cameras	
Control Technologies:	808 Ramp Meters	
Information Technologies:	71 Changeable Message Signs, Highway Advisory Radio	

Name:	Inland Valley Transportation Management Center	5
Location:	San Bernardino, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	71	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, 13 CCTV Cameras	
Control Technologies:	51 Ramp Meters	
Information Technologies:	18 Changeable Message Signs, Highway Advisory Radio	

Name:	San Diego Transportation Management Center	6
Location:	San Diego, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	126	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, 9 CCTV Cameras	
Control Technologies:	134 Ramp Meters	
Information Technologies:	19 Changeable Message Signs, Highway Advisory Radio	

Name:	Orange County Transportation Management Center	7
Location:	Orange County, CA	
Operated by:	California Department of Transportation	
Centerline Miles:	258	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, 4 CCTV Cameras	
Control Technologies:	278 Ramp Meters	
Information Technologies:	27 Changeable Message Signs, Highway Advisory Radio	

Name:	Colorado Traffic Operations Center	8
Location:	Denver, CO	
Operated by:	Colorado Department of Transportation	
Centerline Miles:	7	
Roadway Jurisdictions:	Interstate	
Detection Technologies:	330 Loop Detectors, 15 CCTV	
Control Technologies:		
Information Technologies:	Highway Advisory Radio	

Name:	Connecticut Freeway Advanced Traffic Management System	9
Location:	Hartford, CT	
Operated by:	Connecticut Department of Transportation	
Centerline Miles:	18	
Roadway Jurisdictions:	Interstates	
Detection Technologies:	10 Radar Detection Stations (44 Detectors), 2 CCTV Cameras	
Control Technologies:		
Information Technologies:		

Name:	I-95 Incident Management System	10
Location:	Bridgeport, CT	
Operated by:	Connecticut Department of Transportation	
Centerline Miles:	56	
Roadway Jurisdictions:	Interstate	
Detection Technologies:	Radar Detectors, CCTV Cameras	
Control Technologies:		
Information Technologies:	Changeable Message Signs	

Name:	IDOT Traffic Systems Center	11
Location:	Chicago, IL	
Operated by:	Illinois Department of Transportation	
Centerline Miles:	136	
Roadway Jurisdictions:		
Detection Technologies:	2,000 Loop Detectors	
Control Technologies:	109 Ramp Meters	
Information Technologies:	20 Changeable Message Signs	

Name:	Michigan Intelligent Transportation Systems Center	12
Location:	Detroit, MI	
Operated by:	Michigan Department of Transportation	
Centerline Miles:	32	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	1,240 Loop Detectors, 10 CCTV Cameras	
Control Technologies:	49 Ramp Meters	
Information Technologies:	14 Changeable Message Signs	

Name:	Mn/DOT Traffic Management Center	13
Location:	Minneapolis, MN	
Operated by:	Minnesota Department of Transportation	
Centerline Miles:	160	
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Autoscopes, Loop Detectors, 156 CCTV Cameras	
Control Technologies:	367 Ramp Meters	
Information Technologies:	49 Changeable Message Signs, Highway Advisory Radio, Cable TV Traffic Channel	

Name:	Traffic Operations Center	14
Location:	New Brunswick, NJ	
Operated by:	New Jersey Turnpike Authority	
Centerline Miles:	148	
Roadway Jurisdictions:	Interstate, State Tollway	
Detection Technologies:	Over 900 Loop Detectors, Video Imaging, Microwave Detectors 2 CCTV Cameras	
Control Technologies:	Over 100 variable speed limit and speed warning signs	
Information Technologies:	Over 100 Changeable Message Signs, 2 CCTV Cameras	
Name:	INFORM	15
Location:	Long Island, NY	
Operated by:	New York State Department of Transportation	
Centerline Miles:	35	
Roadway Jurisdictions:	Interstates, Parkways, State Arterials	
Detection Technologies:	2069 Loop Detectors, 34 CCTV Cameras	
Control Technologies:	75 Ramp Meters, 133 Arterial Signals	
Information Technologies:	101 Changeable Message Signs	
Name:	Penn DOT Traffic Operations Center	16
Location:	St. Davids, PA	
Operated by:	Pennsylvania Department of Transportation	
Centerline Miles:	12	
Roadway Jurisdictions:	Interstate	
Detection Technologies:	12 CCTV Cameras	
Control Technologies:		
Information Technologies:	2 Sets of Changeable Message Signs	
Name:	Greater Houston Transportation and Emergency Management Center	17
Location:	Houston, TX	
Operated by:	Texas Department of Transportation	
Centerline Miles:		
Roadway Jurisdictions:		
Detection Technologies:	Loop Detectors, Video Detectors, CCTV Cameras	
Control Technologies:	Ramp Meters, Lane Control Signals	
Information Technologies:	Changeable Message Signs	
Name:		18
Location:	Fort Worth, TX	
Operated by:	Texas Department of Transportation	
Centerline Miles:		
Roadway Jurisdictions:		
Detection Technologies:	Loop Detectors, CCTV Cameras	
Control Technologies:	Lane Control Signals	
Information Technologies:	Changeable Message Signs	

Name:	TransGuide	19
Location:	San Antonio, TX	
Operated by:	Texas Department of Transportation	
Centerline Miles:	25	
Roadway Jurisdictions:		
Detection Technologies:	Loop Detectors, CCTV Cameras	
Control Technologies:	Lane Control Signals	
Information Technologies:	Changeable Message Signs	

Name:		20
Location:	El Paso, TX	
Operated by:	Texas Department of Transportation	
Centerline Miles:		
Roadway Jurisdictions:		
Detection Technologies:	Loop Detectors	
Control Technologies:		
Information Technologies:	Changeable Message Signs	

Name:	Northern Virginia Traffic Management System	21
Location:	Arlington, VA	
Operated by:	Virginia Department of Transportation	
Centerline Miles:	32	
Roadway Jurisdictions:	Interstates	
Detection Technologies:	550 Loop Detectors, 48 CCTV Cameras	
Control Technologies:	26 Ramp Meters	
Information Technologies:	100 Changeable Message Signs	

Name:	Seattle Freeway Management System	22
Location:	Seattle, WA	
Operated by:	Washington Department of Transportation	
Centerline Miles:		
Roadway Jurisdictions:	Interstates, State Highways	
Detection Technologies:	Loop Detectors, CCTV Cameras	
Control Technologies:	Ramp Meters	
Information Technologies:	Changeable Message Signs, Highway Advisory Radio	

Name:	Traffic Operations Center	23
Location:	Milwaukee, WI	
Operated by:	Wisconsin Department of Transportation	
Centerline Miles:	32	
Roadway Jurisdictions:	Interstates, U.S. Highway	
Detection Technologies:	Loop Detectors, Overhead micro-wave Detectors, 14 CCTV Cameras, 1 Video Detector	
Control Technologies:	43 Ramp Meters	
Information Technologies:	11 Changeable Message Signs	

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